H1138

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January 8, 2001

Ms. Joan Kessner
Bechtel Hanford Inc.
3190 George Washington Way
Richland, WA 99352
MSIN: H9-03

Reference: **P.O. #TRC-SBB-207925**
Eberline Services R0-11-098-7562, SDG H1138

Dear Ms. Kessner:

Enclosed is the data report for one water sample designated under SAF No. C01-008 received at Eberline Services on November 10, 2000. The sample was analyzed according to the accompanying chain-of-custody documents.

Please call if you have any questions concerning this report.

Sincerely,

Melissa Mannion

Melissa C. Mannion
Program Manager

MCM

Enclosure: Data Package

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1138 was composed of one water sample designated under SAF No. C01-008 with a Project Designation of: 100HR3 IAM (1 &2) GW Monitoring, November 2000.

The sample was received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analyses

No problems were encountered during the course of the analyses.

2.2 Tritium Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa Mannion 1/8/01

Melissa C. Mannion **Date**
Program Manager

T M A / R I C H M O N D
SAMPLE DELIVERY GROUP H1138

SDG	7562
Contact	Melissa C. Mannion

Client	Hanford
Contract	TRC-SBB-207925
Case no	SDG_H1138

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S

Melissa Mannion
Prepared by

Melissa Mannion
Reviewed by

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-TOC
Version	3.06
Report date	01/08/01

TMA / RICHMOND
SAMPLE DELIVERY GROUP H1138

SDG 7562
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract TRC-SBB-207925
Case no SDG_H1138

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/08/01

SDG 7562
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG_H1138

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/08/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

SAMPLE SUMMARY

SDG 7562
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG H1138

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B10LH5	Hanford Site	WATER		R011098-01	C01-008	C01-008-98	11/09/00 12:41
Method Blank		WATER		R011098-03	C01-008		
Lab Control Sample		WATER		R011098-02	C01-008		
Duplicate (R011098-01)	Hanford Site	WATER		R011098-04	C01-008		11/09/00 12:41
Spike (R011098-01)	Hanford Site	WATER		R011098-05	C01-008		11/09/00 12:41

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 01/08/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

QC SUMMARY

SDG 7562
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG H1138

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	DAYS SINCE COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7562	C01-008-98	B10LH5	WATER				11/10/00	1	R011098-01	7562-001
		Method Blank	WATER						R011098-03	7562-003
		Lab Control Sample	WATER						R011098-02	7562-002
		Duplicate (R011098-01)	WATER				11/10/00	1	R011098-04	7562-004
		Spike (R011098-01)	WATER				11/10/00	1	R011098-05	7562-005

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 01/08/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

PREP BATCH SUMMARY

SDG 7562
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG H1138

TEST	MATRIX	METHOD	PREPARATION BATCH	ERROR 2σ %	PLANCHETS ANALYZED CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALIFIERS
Gas Proportional Counting												
82B	WATER	Gross Beta in Water	6962-101	15.0	1			1	1	1/1		
88A	WATER	Gross Alpha in Water	6962-101	20.0	1			1	1	1/1		
Liquid Scintillation Counting												
H	WATER	Tritium in Water	6962-101	10.0	1			1	1	1/1	1/1	

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 01/08/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

WORK SUMMARY

SDG 7562
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG H1138

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
B10LH5			R011098-01	7562-001	82B/82		12/04/00	01/08/01	MCM	Gross Beta in Water
Hanford Site		WATER	11/09/00	7562-001	88A/88		12/29/00	01/08/01	MCM	Gross Alpha in Water
C01-008-98	C01-008		11/10/00	7562-001	H		12/11/00	01/08/01	MCM	Tritium in Water
Method Blank			R011098-03	7562-003	82B/82		11/28/00	01/08/01	MCM	Gross Beta in Water
		WATER		7562-003	88A/88		12/29/00	01/08/01	MCM	Gross Alpha in Water
	C01-008			7562-003	H		12/11/00	01/08/01	MCM	Tritium in Water
Lab Control Sample			R011098-02	7562-002	82B/82		11/28/00	01/08/01	MCM	Gross Beta in Water
		WATER		7562-002	88A/88		12/29/00	01/08/01	MCM	Gross Alpha in Water
	C01-008			7562-002	H		12/11/00	01/08/01	MCM	Tritium in Water
Duplicate (R011098-01)			R011098-04	7562-004	82B/82		12/04/00	01/08/01	MCM	Gross Beta in Water
Hanford Site		WATER	11/09/00	7562-004	88A/88		12/29/00	01/08/01	MCM	Gross Alpha in Water
	C01-008		11/10/00	7562-004	H		12/12/00	01/08/01	MCM	Tritium in Water
Spike (R011098-01)			R011098-05	7562-005	H		12/12/00	01/08/01	MCM	Tritium in Water
Hanford Site		WATER	11/09/00							
	C01-008		11/10/00							

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
82B/82	C01-008	Gross Beta in Water	900.0_ALPHABETA_GPC	1			1	1	1		4
88A/88	C01-008	Gross Alpha in Water	900.0_ALPHABETA_GPC	1			1	1	1		4
H	C01-008	Tritium in Water	906.0_H3_LSC	1			1	1	1	1	5
TOTALS				3			3	3	3	1	13

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 01/08/01

TMA / RICHMOND

SAMPLE DELIVERY GROUP H1138

R011098-03 **Method Blank**

METHOD BLANK

SDG	7562	Client/Case no	Hanford SDG H1138
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R011098-03	Client sample id	Method Blank
Dept sample id	7562-003	Material/Matrix	WATER
		SAF No	C01-008

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	-0.413	0.69	1.7	3.0	U	88A
Gross Beta	12587-47-2	-0.632	0.99	1.7	4.0	U	82B
Tritium	10028-17-8	57.9	230	380	400	U	H

100HR3 IAM (1 & 2) GW Mon.-Nov. 2000

QC-BLANK 36646

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 01/08/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

R011098-02 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7562 Client/Case no Hanford SDG H1138
Contact Melissa C. Mannion Case no TRC-SBB-207925

Lab sample id R011098-02 Client sample id Lab Control Sample
Dept sample id 7562-002 Material/Matrix WATER
SAF No C01-008

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	97.6	7.5	1.7	3.0		88A	108	4.3	90	70-130	70-130
Gross Beta	122	7.9	5.1	4.0		82B	121	4.8	101	75-125	70-130
Tritium	9770	450	360	400		H	9920	400	98	83-117	80-120

100HR3 IAM (1 & 2) GW Mon.-Nov. 2000

QC-LCS 36645

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 01/08/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

R011098-04 B10LH5

DUPLICATE

SDG 7562 Client/Case no Hanford SDG H1138

Contact Melissa C. Mannion Case no TRC-SBB-207925

DUPLICATE	ORIGINAL	
Lab sample id R011098-04	Lab sample id R011098-01	Client sample id B10LH5
Dept sample id 7562-004	Dept sample id 7562-001	Location/Matrix Hanford Site WATER
	Received 11/10/00	Collected 11/09/00 12:41
		Custody/SAF No C01-008-98 C01-008

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Gross Alpha	1.58	1.6	2.4	3.0	U	88A	0.688	1.4	2.2	U	-	
Gross Beta	7.02	2.4	3.5	4.0		82B	11.7	2.4	3.2		50	64
Tritium	3410	200	180	400		H	3530	200	180		3	24

100HR3 IAM (1 & 2) GW Mon.-Nov. 2000

QC-DUP#1 36647

DUPLICATES
Page 1
SUMMARY DATA SECTION
Page 9

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 01/08/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

R011098-05

B10LH5

MATRIX SPIKE

SDG 7562 | Client/Case no Hanford | SDG H1138

Contact Melissa C. Mannion | Case no TRC-SBB-207925

MATRIX SPIKE	ORIGINAL	
Lab sample id R011098-05	Lab sample id R011098-01	Client sample id B10LH5
Dept sample id 7562-005	Dept sample id 7562-001	Location/Matrix Hanford Site WATER
	Received 11/10/00	Collected 11/09/00 12:41
		Custody/SAF No C01-008-98 C01-008

ATE	SPIKE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	ORIGINAL pCi/L	2σ ERR (COUNT)	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
	23500	470	200	400		H	21000	840	3530	200	95	82-118	60-140

1 & 2) GW Mon.-Nov. 2000

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-MS
Version 3.06
Report date 01/08/01

TMA / RICHMOND

SAMPLE DELIVERY GROUP H1138

R011098-01 **B10LH5**

DATA SHEET

SDG	7562	Client/Case no	Hanford SDG H1138
Contact	Melissa C. Mannion	Contract	TRC-SBB-207925
Lab sample id	R011098-01	Client sample id	B10LH5
Dept sample id	7562-001	Location/Matrix	Hanford Site WATER
Received	11/10/00	Collected	11/09/00 12:41
		Custody/SAF No	C01-008-98 C01-008

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	0.688	1.4	2.2	3.0	U	88A
Gross Beta	12587-47-2	11.7	2.4	3.2	4.0		82B
Tritium	10028-17-8	3530	200	180	400		H

100HR3 IAM (1 & 2) GW Mon.-Nov. 2000

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	01/08/01

Test 82B Matrix WATER
SDG 7562
Contact Melissa C. Mannion

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

METHOD SUMMARY

GROSS BETA IN WATER
GAS PROPORTIONAL COUNTING

Client Hanford
Contract TRC-SBB-207925
Contract SDG H1138

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	1: Gross Beta	2: Sum, Beta Emitters	RESULT RATIO (%) 2÷1	RESULT RATIO (%) 2σ
Preparation batch 6962-101								
B10LH5	R011098-01	82		7562-001	11.7			
BLK (QC ID=36646)	R011098-03	82		7562-003	U			
LCS (QC ID=36645)	R011098-02	82		7562-002	ok			
Duplicate (R011098-01)	R011098-04	82		7562-004	ok			
Nominal values and limits from method				RDLs (pCi/L)	4.0			
100HR3 IAM (1 & 2) GW Mon.-Nov. 2000						Average		

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6962-101	2σ prep error 15.0 %			Reference Lab Notebook 6962 pg. 101												
B10LH5	R011098-01	82		3.2	0.200			57	100				25	11/23/00	12/04	GRB-111
BLK (QC ID=36646)	R011098-03	82		1.7	0.200			22	278					11/23/00	11/28	GRB-113
LCS (QC ID=36645)	R011098-02	82		5.1	0.200			24	49					11/23/00	11/28	GRB-112
Duplicate (R011098-01) (QC ID=36647)	R011098-04	82		3.5	0.200			58	100				25	11/23/00	12/04	GRB-112
Nominal values and limits from method				4.0	0.200			5-250	100				180			

PROCEDURES REFERENCE 900.0_ALPHABETA_GPC
CP-120 Gross Alpha and Gross Beta in Water, rev 3

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 3.4 ± 2.8
RESIDUE 40 ± 40

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 01/08/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

METHOD SUMMARY

GROSS ALPHA IN WATER

GAS PROPORTIONAL COUNTING

Test 88A Matrix WATER
SDG 7562
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Contract SDG H1138

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Gross Alpha
Preparation batch 6962-101					
B10LH5	R011098-01	88		7562-001	U
BLK (QC ID=36646)	R011098-03	88		7562-003	U
LCS (QC ID=36645)	R011098-02	88		7562-002	ok
Duplicate (R011098-01)	R011098-04	88		7562-004	- U
Nominal values and limits from method				RDLs (pCi/L)	3.0
100HR3 IAM (1 & 2) GW Mon.-Nov. 2000					

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6962-101 *2σ prep error 20.0 %* *Reference Lab Notebook 6962 pg. 101*																
B10LH5	R011098-01	88		2.2	0.200			64		100			50	11/28/00	12/29	GRB-107
BLK (QC ID=36646)	R011098-03	88		1.7	0.200			26		100				11/28/00	12/29	GRB-110
LCS (QC ID=36645)	R011098-02	88		1.7	0.200			24		100				11/28/00	12/29	GRB-108
Duplicate (R011098-01) (QC ID=36647)	R011098-04	88		2.4	0.200			68		100			50	11/28/00	12/29	GRB-111
Nominal values and limits from method				3.0	0.200			5-250		100			180			

PROCEDURES REFERENCE 900.0_ALPHABETA_GPC
CP-120 Gross Alpha and Gross Beta in Water, rev 3

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 2.0 ± 0.71
RESIDUE 46 ± 47

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 01/08/01

TMA/RICHMOND

SAMPLE DELIVERY GROUP H1138

METHOD SUMMARY

TRITIUM IN WATER

LIQUID SCINTILLATION COUNTING

Test H Matrix WATER
SDG 7562
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Contract SDG H1138

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Tritium
Preparation batch 6962-101					
B10LH5	R011098-01			7562-001	3530
BLK (QC ID=36646)	R011098-03			7562-003	U
LCS (QC ID=36645)	R011098-02			7562-002	ok
Duplicate (R011098-01)	R011098-04			7562-004	ok
Spike (R011098-01)	R011098-05			7562-005	ok
Nominal values and limits from method				RDLs (pCi/L)	400
100HR3 IAM (1 & 2) GW Mon.-Nov. 2000					

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6962-101	2σ prep error 10.0 %			Reference Lab Notebook 6962 pg. 101												
B10LH5	R011098-01			180	0.0500			20		100			32	12/08/00	12/11	LSC-006
BLK (QC ID=36646)	R011098-03			380	0.0500			10		100				12/08/00	12/11	LSC-006
LCS (QC ID=36645)	R011098-02			360	0.0500			10		100				12/08/00	12/11	LSC-006
Duplicate (R011098-01) (QC ID=36647)	R011098-04			180	0.0500			20		100			33	12/08/00	12/12	LSC-006
Spike (R011098-01) (QC ID=36648)	R011098-05			200	0.0500			18		100			33	12/08/00	12/12	LSC-006
Nominal values and limits from method				400	0.0500					25			180			

PROCEDURES REFERENCE 906.0_H3_LSC
CP-210 Tritium in Water Samples by Distillation, rev 3

AVERAGES ± 2 SD FOR 5 SAMPLES
MDA 260 ± 200
YIELD 16 ± 10

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 01/08/01

TMA / RICHMOND
SAMPLE DELIVERY GROUP H1138

REPORT GUIDE

SDG 7562
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG H1138

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

* LAB SAMPLE ID is the lab's primary identification for a sample.

* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.

* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.

* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

  QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/08/01

SDG 7562
Contact Melissa C. Mannion

Client Hanford
Contract TRC-SBB-207925
Case no SDG_H1138

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

* The preparation batches are shown in the same order as the Method Summary Reports are printed.

* Only analyses of planchets relevant to the SDG are included.

* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.

* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

  These qualifiers should be reviewed as follows:

  X Some data has been manually entered or modified. Transcription errors are possible.

  P One or more results are 'preliminary'. The data is not ready for final reporting.

  2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

  Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 01/08/01

SDG 7562
Contact Melissa C. Mannion

TMA / RICHMOND
SAMPLE DELIVERY GROUP H1138
REPORT GUIDE

Client Hanford
Contract TRC-SBB-207925
Case no SDG H1138

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.

* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.

* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.

* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.

* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
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DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.

* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

  The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

* ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.

* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.

* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

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GUIDE, cont.

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DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.

B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.

H Similar to 'L' except the recovery was high.

P The RESULT is 'preliminary'.

X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.

2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

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DATA SHEET

* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.

* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.

* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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REPORT GUIDE

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LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.

* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

  An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The error of RESULT, including that introduced by rounding the result prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits for the recovery.

* The recovery is underlined if it is outside either of these ranges.

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DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

  If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

  For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTs prior to printing.

  If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

  This value reported for this limit is at most 999.

* The second limit for the RPD is the larger of:

  1. A fixed percentage specified in the protocol.

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GUIDE, cont.

Client Hanford
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DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

* The RPD is underlined if it is greater than either limit.

* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

  Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

  An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The errors of the two RESULTs, including those introduced by rounding them prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits

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MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

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METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

  There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

  The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

  The J and X flags are as on the data sheet.

* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.

* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.

* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

  MDAs are underlined if greater than the printed RDL.

* Aliquots are underlined if less than the nominal value specified for the method.

* Prepareation factors are underlined if greater than the nominal value specified for the method.

* Dilution factors are underlined if greater than the nominal value specified for the method.

* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.

* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.

* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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GUIDE, cont.

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METHOD SUMMARY

* Count times are underlined if less than the nominal value specified for the method.

* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.

* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.

* Days Held are underlined if greater than the holding time specified in the protocol.

* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. *Results less than their MDA are not included.* No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the *measurements*.

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PNNL

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # C01-008-98

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Collector: J Hogan	Contact/Requester: JH KESSNER	Telephone No.: (509) 375-4688	MSIN: FAX:
SAF No.: C01-008	Sampling Origin: HANFORD SITE H1138 (7562)	Purchase Order/Charge Code:	
Project Title: 100HR3 IAM (1&2) GW MONITORING, NOVEMBER, 2000	Logbook No.: WM-SAWS-439	Ice Chest No.: SMC-222	Temp.:
Shipped To (Lab): TMA/RECRA	Method of Shipment: GOVT. VEHICLE	Bill of Lading/Air Bill No.: 4235 7954 0463	
Protocol: CERCLA	Data Turnaround: 45 Days	Offsite Property No.:	

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time — Total Activity Exemption: Yes ☑ No ☐
Fax TMA log-in to JH Kessner (372-9487) & DL Stewart (372-1704).

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B10LH4 (F) ✓		W	11-9-00	1241 ✓	1x500-mL G/P	ICP Metals - 6010A RCRA GW ✓	HNO3 to pH <2
B10LH5 ✓		W			1x500-mL G/P	ICP Metals - 6010A RCRA GW ✓	HNO3 to pH <2
B10LH5 ✓		W			1x500-mL P	IC Anions - 300.0 ✓	Cool 4C
B10LH5 ✓		W			1x20-mL P	Activity Scan ✓	None
B10LH5 ✓		W			2x1000-mL G/P	Gross Alpha ✓	HNO3 to pH <2
B10LH5 ✓		W			2x1000-mL G/P	Gross Beta ✓	HNO3 to pH <2
B10LH5 ✓		W			1x250-mL P	Tritium - H3 ✓	None

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
J. Hogan	J Hogan		11-09-00 1415	FED EX			11/09/00
FED. EXPRESS			11/10/00 10 AM	E. Segura			11/10/00 10 AM

Matrix *

S = Soil	SE = Sediment	SO = Solid	SL = Sludge
W = Water	O = Oil	A = Air	DS = Drum Solid
DL = Drum Liqui	T = Tissue	WI = Wipe	L = Liquid
V = Vegetation	X = Other		

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

ThermoRetec
Richmond Laboratory

Analytical Services

ICE CHEST RECEIPT LOG

Use one form per shipment. Refer to Thermometer Correction Log for correction factor.

Customer: (WMTS) BECHTEL HANFORD (PNNL) Date: 11-10-00 10:AM

Ice chest # or description	SML-222					
Thermometer: time in	9:45					
Thermometer: time out	11:15					
Thermometer reading	4°C					
Thermometer number	2132					
Correction factor	NONE					
Actual temperature*	—					
Custody seals on ice chest intact?	Yes					
Custody seals dated ?	Yes					
Custody seals signed?	Yes					
Custody seals on samples?	NO					
Ice chest scanned for activity?	Yes					

* Temperature is in degrees centigrade.

Technician: _____

Comments: _____

ThermoRetec
Richmond Laboratory

Analytical Services

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT

Client: WMTS (BECHTEL HANFORD (PNNL)) Date/Time received 11/10/00 10:AM

CoC No. C01-008-98

Container I.D. No. SML-222 Requested TAT (Days) 45 P.O. Received Yes [ ] No [✓]

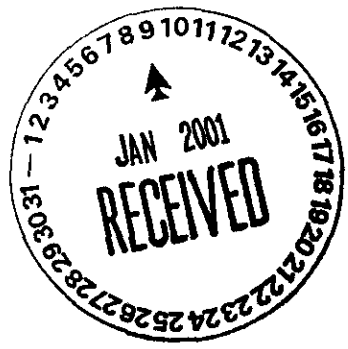
INSPECTION

1.	Custody seals on shipping container intact?	Yes [✓]	No [ ]	N/A [ ]
2.	Custody seals on shipping container dated & signed?	Yes [✓]	No [ ]	N/A [ ]
3.	Custody seals on sample containers intact?	Yes [✓]	No [ ]	N/A [ ]
4.	Custody seals on sample containers dated & signed?	Yes [✓]	No [ ]	N/A [ ]
5.	Cooler Temperature: _____	Packing material is:	Wet [ ]	Dry [✓]
6.	Number of samples in shipping container: 2			
7.	Number of containers per sample: PLEASE (Or see CoC _____)			
8.	Paperwork agrees with samples?	Yes [✓]	No [ ]	
9.	Samples have: Tape [ ] Hazard labels [ ] Rad labels [ ] Appropriate sample labels [✓]			
10.	Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]			
11.	Describe any anomalies: _____			
13.	Was P.M. notified of any anomalies? Yes [ ] No [ ] Date _____			
14.	Received by E. Segura Date: 11/10/00 Time: 10:Am			

Customer Sample No.	cpm	mr/hr	Customer Sample No.	Cpm	mr/hr

Ion Chamber Ser. No. _____ Calibration date _____

Survey Meter Ser No. _____ Calibration date _____



Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD C01-008 H1138

DATE RECEIVED: 11/15/00 RFW LOT # :0011L265

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B10LH4 (F)						
SILVER, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/22/00
SILVER, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/22/00
SILVER, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/22/00
ALUMINUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
ALUMINUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
ALUMINUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
BARIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/22/00
BARIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/22/00
BARIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/22/00
BERYLLIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
BERYLLIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
BERYLLIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
CALCIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
CALCIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
CALCIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
CADMIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
CADMIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
CADMIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
COBALT, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
COBALT, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
COBALT, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
CHROMIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
CHROMIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
CHROMIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
COPPER, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/22/00
COPPER, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/22/00
COPPER, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/22/00
IRON, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/22/00
IRON, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/22/00
IRON, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/22/00
POTASSIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
POTASSIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
POTASSIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
MAGNESIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
MAGNESIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD C01-008 H1138

DATE RECEIVED: 11/15/00 RFW LOT # :0011L265

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MAGNESIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
MANGANESE, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
MANGANESE, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
MANGANESE, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
SODIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/22/00
SODIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/22/00
SODIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/22/00
NICKEL, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
NICKEL, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
NICKEL, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
ANTIMONY, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
ANTIMONY, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
ANTIMONY, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
STRONTIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/23/00
STRONTIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/23/00
STRONTIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/23/00
VANADIUM, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
VANADIUM, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
VANADIUM, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
ZINC, TOTAL	001	W	99L1811	11/09/00	12/13/00	12/20/00
ZINC, TOTAL	001 REP	W	99L1811	11/09/00	12/13/00	12/20/00
ZINC, TOTAL	001 MS	W	99L1811	11/09/00	12/13/00	12/20/00
B10LH5						
SILVER, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/22/00
ALUMINUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
BARIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/22/00
BERYLLIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
CALCIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
CADMIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
COBALT, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
CHROMIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
COPPER, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/22/00
IRON, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/22/00
POTASSIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
MAGNESIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
MANGANESE, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD C01-008 H1138

DATE RECEIVED: 11/15/00 RFW LOT # :0011L265

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SODIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/22/00
NICKEL, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
ANTIMONY, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
STRONTIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/23/00
VANADIUM, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00
ZINC, TOTAL	002	W	99L1811	11/09/00	12/13/00	12/20/00

LAB QC:

SILVER LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/22/00
SILVER, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/22/00
ALUMINUM LABORTORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
ALUMINUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
BARIUM LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/22/00
BARIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/22/00
BERYLLIUM LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
BERYLLIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
CALCIUM LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
CALCIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
CADMIUM LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
CADMIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
COBALT LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
COBALT, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
CHROMIUM LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
CHROMIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
COPPER LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/22/00
COPPER, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/22/00
IRON LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/22/00
IRON, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/22/00
POTASSIUM LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
POTASSIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
MAGNESIUM LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
MAGNESIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
MANGANESE LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
MANGANESE, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
SODIUM LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/22/00
SODIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/22/00
NICKEL LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD C01-008 H1138

DATE RECEIVED: 11/15/00 RFW LOT # :0011L265

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NICKEL, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
ANTIMONY LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
ANTIMONY, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
STRONTIUM LCS STANDA	LC1 BS	W	99L1811	N/A	12/13/00	12/21/00
STRONTIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/21/00
VANADIUM LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
VANADIUM, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00
ZINC LABORATORY	LC1 BS	W	99L1811	N/A	12/13/00	12/20/00
ZINC, TOTAL	MB1	W	99L1811	N/A	12/13/00	12/20/00

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD C01-008
RFW#: 0011L265
SDG/SAF#: H1138/C01-008

W.O.#: 10985-001-001-9999-00
Date Received: 11-15-00

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 water samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

   The ISB for Iron was low in file PS1220D. All samples were rerun for Iron in file PS1222A.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury) with the exception of the CCVs for Silver, Barium, Calcium, Sodium, and Strontium in file PS1220D. All samples were rerun for these analytes in file PS1222A. The ending CCVs for Strontium were outside control limits in file PS1221B. All samples were rerun for Strontium in file TA1223B.

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.

10. All matrix spike (MS) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

11. The duplicate analyses for 3 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

13. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Pat E

J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

01-04-01
Date

gmb/m11-265

METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 90112265

Leaching Procedure: __1310 __1311 __1312 __Other:_____

CLP Metals __ Digestion and __ Analysis Methods: __ILM03.0 __ILM04.0

Metals Digestion Methods: ✓3005A __3010A __3015 __3020A __3050B __3051 __200.7 __SS17
__Other: _____

Metals Analysis Methods

	SW846	EPA	STD MTD	EPA OSWR	USATHAMA
Aluminum	__6010B	__200.7			__99
Antimony	__6010B __7041 [5]	__200.7 __204.2			__99
Arsenic	__6010B __7060A [5]	__200.7 __206.2	__3113B		__99
Barium	__6010B	__200.7			__99
Beryllium	__6010B	__200.7			__99
Bismuth	__6010B [1]	__200.7 [1]		__1620	__99
Boron	__6010B	__200.7			__99
Cadmium	__6010B __7131A [5]	__200.7 __213.2			__99
Calcium	__6010B	__200.7			__99
Chromium	__6010B __7191 [6]	__200.7 __218.2			__SS17
Cobalt	__6010B	__200.7			__99
Copper	__6010B __7211 [5]	__200.7 __220.2			__99
Iron	__6010B	__200.7			__99
Lead	__6010B __7421 [5]	__200.7 __239.2	__3113B		__99
Lithium	__6010B __7430 [4]	__200.7		__1620	__99
Magnesium	__6010B	__200.7			__99
Manganese	__6010B	__200.7			__99
Mercury	__7470A [3] __7471A [3]	__245.1 [2] __245.5 [2]			__99
Molybdenum	__6010B	__200.7			__99
Nickel	__6010B	__200.7			__99
Potassium	__6010B __7610 [4]	__200.7 __258.1 [4]			__99
Rare Earths	__6010B [1]	__200.7 [1]		__1620	__99
Selenium	__6010B __7740 [5]	__200.7 __270.2	__3113B		__99
Silicon	__6010B [1]	__200.7		__1620	__99
Silica	__6010B	__200.7		__1620	__99
Silver	__6010B __7761 [5]	__200.7 __272.2			__99
Sodium	__6010B __7770 [4]	__200.7 __273.1 [4]			__99
Strontium	__6010B	__200.7			__99
Thallium	__6010B __7841 [5]	__200.7 __279.2 __200.9			__99
Tin	__6010B	__200.7			__99
Titanium	__6010B	__200.7			__99
Uranium	__6010B [1]	__200.7 [1]		__1620	__99
Vanadium	__6010B	__200.7			__99
Zinc	__6010B	__200.7			__99
Zirconium	__6010B [1]	__200.7 [1]		__1620	__99

Other:_____ Method:_____

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LCS = Laboratory Control Sample.
NC = Not calculated.

ANALYTICAL METAL METHODS

1. Not included in the method element list.

2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).

3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).

4. Flame AA.

5. Graphite Furnace AA.

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INORGANICS DATA SUMMARY REPORT 01/04/01

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B10LH4 (F)	Silver, Total	2.5	u	UG/L	2.5	1.0
		Aluminum, Total	19.1	u	UG/L	19.1	1.0
		Barium, Total	58.8		UG/L	3.0	1.0
		Beryllium, Total	0.60	u	UG/L	0.60	1.0
		Calcium, Total	61200		UG/L	15.4	1.0
		Cadmium, Total	3.4	u	UG/L	3.4	1.0
		Cobalt, Total	5.6	u	UG/L	5.6	1.0
		Chromium, Total	29.2		UG/L	4.9	1.0
		Copper, Total	2.6	u	UG/L	2.6	1.0
		Iron, Total	24.5		UG/L	3.8	1.0
		Potassium, Total	6410		UG/L	303	1.0
		Magnesium, Total	11600		UG/L	27.4	1.0
		Manganese, Total	2.3	u	UG/L	2.3	1.0
		Sodium, Total	20500		UG/L	22.9	1.0
		Nickel, Total	12.5	u	UG/L	12.5	1.0
		Antimony, Total	17.0	u	UG/L	17.0	1.0
		Strontium, Total	294		UG/L	5.5	1.0
		Vanadium, Total	6.0		UG/L	4.8	1.0
		Zinc, Total	2.7	u	UG/L	2.7	1.0

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 01/04/01

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	B10LH5	Silver, Total	2.5	u	UG/L	2.5	1.0
		Aluminum, Total	155		UG/L	19.1	1.0
		Barium, Total	62.3		UG/L	3.0	1.0
		Beryllium, Total	0.60	u	UG/L	0.60	1.0
		Calcium, Total	58800		UG/L	15.4	1.0
		Cadmium, Total	3.4	u	UG/L	3.4	1.0
		Cobalt, Total	5.6	u	UG/L	5.6	1.0
		Chromium, Total	29.2		UG/L	4.9	1.0
		Copper, Total	2.6	u	UG/L	2.6	1.0
		Iron, Total	358		UG/L	3.8	1.0
		Potassium, Total	5240		UG/L	303	1.0
		Magnesium, Total	11100		UG/L	27.4	1.0
		Manganese, Total	9.5		UG/L	2.3	1.0
		Sodium, Total	20600		UG/L	22.9	1.0
		Nickel, Total	12.5	u	UG/L	12.5	1.0
		Antimony, Total	17.0	u	UG/L	17.0	1.0
		Strontium, Total	284		UG/L	5.5	1.0
		Vanadium, Total	6.1		UG/L	4.8	1.0
		Zinc, Total	11.2		UG/L	2.7	1.0

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INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/04/01

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	99L1811-MB1	Silver, Total	2.5	u	UG/L	2.5	1.0
		Aluminum, Total	19.1	u	UG/L	19.1	1.0
		Barium, Total	3.0	u	UG/L	3.0	1.0
		Beryllium, Total	0.60	u	UG/L	0.60	1.0
		Calcium, Total	47.1		UG/L	15.4	1.0
		Cadmium, Total	3.4	u	UG/L	3.4	1.0
		Cobalt, Total	5.6	u	UG/L	5.6	1.0
		Chromium, Total	4.9	u	UG/L	4.9	1.0
		Copper, Total	2.6	u	UG/L	2.6	1.0
		Iron, Total	8.4		UG/L	3.8	1.0
		Potassium, Total	331		UG/L	303	1.0
		Magnesium, Total	29.3		UG/L	27.4	1.0
		Manganese, Total	2.3	u	UG/L	2.3	1.0
		Sodium, Total	107		UG/L	22.9	1.0
		Nickel, Total	12.5	u	UG/L	12.5	1.0
		Antimony, Total	17.0	u	UG/L	17.0	1.0
		Strontium, Total	5.5	u	UG/L	5.5	1.0
		Vanadium, Total	4.8	u	UG/L	4.8	1.0
		Zinc, Total	2.7	u	UG/L	2.7	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 01/04/01

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B10LH4 (F)	Silver, Total	47.9	2.5 u	50.0	95.8	1.0
		Aluminum, Total	1740	19.1 u	2000	87.1	1.0
		Barium, Total	2060	58.8	2000	100.1	1.0
		Beryllium, Total	42.9	0.60u	50.0	85.8	1.0
		Calcium, Total	84100	61200	25000	91.5	1.0
		Cadmium, Total	44.1	3.4 u	50.0	88.2	1.0
		Cobalt, Total	453	5.6 u	500	90.6	1.0
		Chromium, Total	202	29.2	200	86.2	1.0
		Copper, Total	249	2.6 u	250	99.6	1.0
		Iron, Total	1040	24.5	1000	101.1	1.0
		Potassium, Total	27100	6410	25000	82.9	1.0
		Magnesium, Total	34000	11600	25000	89.7	1.0
		Manganese, Total	438	2.3 u	500	87.5	1.0
		Sodium, Total	46000	20500	25000	102.2	1.0
		Nickel, Total	453	12.5 u	500	90.5	1.0
		Antimony, Total	467	17.0 u	500	93.5	1.0
		Strontium, Total	1250	294	1000	96.0	1.0
		Vanadium, Total	438	6.0	500	86.4	1.0
		Zinc, Total	461	2.7 u	500	92.2	1.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 01/04/01

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD		DILUTION FACTOR(REP)
-001REP	B10LH4 (F)	Silver, Total	2.5 u	2.5 u	NC		1.0
		Aluminum, Total	19.1 u	19.1 u	NC		1.0
		Barium, Total	58.8	58.9	0.17		1.0
		Beryllium, Total	0.60u	0.60u	NC		1.0
		Calcium, Total	61200	60800	0.66		1.0
		Cadmium, Total	3.4 u	3.4 u	NC		1.0
		Cobalt, Total	5.6 u	5.6 u	NC		1.0
		Chromium, Total	29.2	23.3	22.5		1.0
		Copper, Total	2.6 u	2.6 u	NC		1.0
		Iron, Total	24.5	26.8	9.0		1.0
		Potassium, Total	6410	5380	17.4		1.0
		Magnesium, Total	11600	11500	1.2		1.0
		Manganese, Total	2.3 u	2.3 u	NC		1.0
		Sodium, Total	20500	20500	0.11		1.0
		Nickel, Total	12.5 u	12.5 u	NC		1.0
		Antimony, Total	17.0 u	17.0 u	NC		1.0
		Strontium, Total	294	292	0.99		1.0
		Vanadium, Total	6.0	4.8 u	NC	200	1.0
		Zinc, Total	2.7 u	4.8	NC	200	1.0

1/4/01

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 01/04/01

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	99L1811-LC1	Silver, LCS	512	500	UG/L	102.4
		Aluminum, LCS	4900	5000	UG/L	98.0
		Barium, LCS	5140	5000	UG/L	102.9
		Beryllium, LCS	236	250	UG/L	94.6
		Calcium, LCS	24300	25000	UG/L	97.1
		Cadmium, LCS	245	250	UG/L	98.0
		Cobalt, LCS	2430	2500	UG/L	97.2
		Chromium, LCS	475	500	UG/L	95.0
		Copper, LCS	1290	1250	UG/L	103.0
		Iron, LCS	5230	5000	UG/L	104.5
		Potassium, LCS	24100	25000	UG/L	96.3
		Magnesium, LCS	24100	25000	UG/L	96.5
		Manganese, LCS	718	750	UG/L	95.7
		Sodium, LCS	26000	25000	UG/L	104.0
		Nickel, LCS	1920	2000	UG/L	96.1
		Antimony, LCS	2890	3000	UG/L	96.3
		Strontium, LCS	5520	5000	UG/L	110.3
		Vanadium, LCS	2380	2500	UG/L	95.3
		Zinc, LCS	967	1000	UG/L	96.7

RECRA LabNet Use Only

C0111205

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

RECRA LabNet

Client: TMU-Hanford C01-008
Est. Final Proj. Sampling Date:
Project #: 10985-001-001-9999-00
Project Contact/Phone #:
RECRA Project Manager: OJ
QC: Spec Del: Std TAT: 30 day
Date Rec'd: 11-15-00 Date Due: 12-15-00
Account #:

Refrigerator #

#/Type Container	Liquid	A: 5	B: 5
	Solid	1P	1P
Volume	Liquid	500	500
	Solid		
Preservatives		HNO3	

ANALYSES REQUESTED → ORGANIC: VOA, BNA, Pest/PCB, Herb; INORG: Metal, CN

RECRA LabNet Use Only

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	RECRA LabNet Use Only: Metal	CN
001	B10LH4 (F)			W	111900	1241	✓	
002	1 5			1	1	1	✓	✓

Special Instructions: SOF C01-008

Run Matrix QC

DATE/REVISIONS:

Mrl(1) 1. Al, Ag, Ba, Br, Ca, Cd, Cr, Co, Cu, Fe, K, Mg,
1 2. Mn, Ni, Na, Sb, Sr, V, Zn
IC(1) 3. Br, Cl, F, NO2, NO3, PO4, SO4
4.
5.
6.

RECRA LabNet Use Only

Samples were: 1) Shipped ✓ or Hand Delivered
Airbill # Screbkew
2) Ambient or Chilled
3) Received In Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times Y or (N)

COC Tape was: 1) Present on Outer Package (Y) or N; 2) Unbroken on Outer Package (Y) or N; 3) Present on Sample (Y) or N; 4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Cooler Temp 5.5 C

Relinquished by	Received by	Date	Time
FedEx	TBapp1	11-15-00	1000

Relinquished by	Received by	Date	Time
COMPOSITE WASTE	ORIGINAL REWRITTEN		

Discrepancies Between Samples Labels and COC Record? Y or (N)
NOTES:

MDS 9L5 9505 152

PNNL

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # C01-008-98

CHEM SDG H1138

Page 1 of 1

Collector: J Hogan	Contact/Requester: JH KESSNER	Telephone No.: (509) 375-4688 MSIN FAX
SAF No.: C01-008	Sampling Origin: HANFORD SITE	Purchase Order/Charge Code
Project Title: 100HR3 IAM (1&2) GW MONITORING, NOVEMBER, 2000	Logbook No.: WM-SAWS-H39	Ice Chest No.: SMC-222 Temp.
Shipped To (Lab): TMA/RECRA	Method of Shipment: GOVT. VEHICLE	Bill of Lading/Air Bill No.: 4235 7954 0463
Protocol: CERCLA	Data Turnaround: 45 Days	Offsite Property No.

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

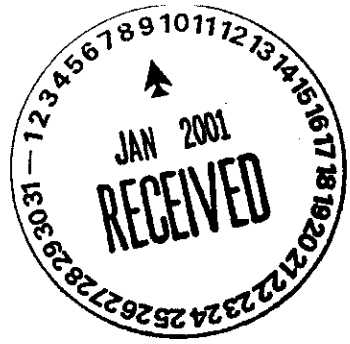
SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☑ No ☐
Fax TMA log-in to JH Kessner (372-9487) & DL Stewart (372-1704).

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B10LH4 (F) ✓		W	11-9-00	1241	1x500-mL G/P	ICP Metals - 6010A RCRA GW	HNO3 to pH <2
B10LH5 ✓		W	↓	↓	1x500-mL G/P	ICP Metals - 6010A RCRA GW	HNO3 to pH <2
B10LH5 ✓		W	↓	↓	1x500-mL P	IC Anions - 300.0	Cool 4C
B10LH5 ✓		W	↓	↓	1x20-mL P	Activity Scan	None
B10LH5 ✓		W	↓	↓	2x1000-mL G/P	Gross Alpha	HNO3 to pH <2
B10LH5 ✓		W	↓	↓	2x1000-mL G/P	Gross Beta	HNO3 to pH <2
B10LH5		W	↓	↓	1x250-mL P	Tritium - H3	None

Relinquished By (Print / Sign)	Date/Time	Received By (Print / Sign)	Date/Time
J. Hogan / J Hogan	11-09-00 1415	FED EX	11/09/00
FED. EXPRESS	11/10/00 10 AM	E. Segura	11/10/00 10 AM
JR Cross / JR Cross	11-14-00 1130	Fed Ex	11/14/00
Fed Ex	11-15-00 1000	TKepper	11-15-00 1000

Matrix *
S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air
DS = Drum Solid; DL = Drum Liquid; T = Tissue; WI = Wipe; L = Liquid; V = Vegetation; X = Other

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time



Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD C01-008 H1138

DATE RECEIVED: 11/15/00 RFW LOT # :0011L265

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B10LH5						
BROMIDE BY IC	002	W	00LIC075	11/09/00	11/28/00	11/28/00
BROMIDE BY IC	002 REP	W	00LIC075	11/09/00	11/28/00	11/28/00
BROMIDE BY IC	002 MS	W	00LIC075	11/09/00	11/28/00	11/28/00
CHLORIDE BY IC	002	W	00LIC075	11/09/00	11/28/00	11/28/00
CHLORIDE BY IC	002 REP	W	00LIC075	11/09/00	11/28/00	11/28/00
CHLORIDE BY IC	002 MS	W	00LIC075	11/09/00	11/28/00	11/28/00
FLUORIDE BY IC	002	W	00LIC075	11/09/00	11/28/00	11/28/00
FLUORIDE BY IC	002 REP	W	00LIC075	11/09/00	11/28/00	11/28/00
FLUORIDE BY IC	002 MS	W	00LIC075	11/09/00	11/28/00	11/28/00
NITRITE BY IC	002	W	00LIC075	11/09/00	11/28/00	11/28/00
NITRITE BY IC	002 REP	W	00LIC075	11/09/00	11/28/00	11/28/00
NITRITE BY IC	002 MS	W	00LIC075	11/09/00	11/28/00	11/28/00
NITRATE BY IC	002	W	00LIC075	11/09/00	11/28/00	11/28/00
NITRATE BY IC	002 REP	W	00LIC075	11/09/00	11/28/00	11/28/00
NITRATE BY IC	002 MS	W	00LIC075	11/09/00	11/28/00	11/28/00
PHOSPHATE BY IC	002	W	00LIC075	11/09/00	11/28/00	11/28/00
PHOSPHATE BY IC	002 REP	W	00LIC075	11/09/00	11/28/00	11/28/00
PHOSPHATE BY IC	002 MS	W	00LIC075	11/09/00	11/28/00	11/28/00
SULFATE BY IC	002	W	00LIC075	11/09/00	11/28/00	11/28/00
SULFATE BY IC	002 REP	W	00LIC075	11/09/00	11/28/00	11/28/00
SULFATE BY IC	002 MS	W	00LIC075	11/09/00	11/28/00	11/28/00
LAB QC:						
BROMIDE BY IC	MB1	W	00LIC075	N/A	11/28/00	11/28/00
BROMIDE BY IC	MB1 BS	W	00LIC075	N/A	11/28/00	11/28/00
CHLORIDE BY IC	MB1	W	00LIC075	N/A	11/28/00	11/28/00
CHLORIDE BY IC	MB1 BS	W	00LIC075	N/A	11/28/00	11/28/00
FLUORIDE BY IC	MB1	W	00LIC075	N/A	11/28/00	11/28/00
FLUORIDE BY IC	MB1 BS	W	00LIC075	N/A	11/28/00	11/28/00
NITRITE BY IC	MB1	W	00LIC075	N/A	11/28/00	11/28/00
NITRITE BY IC	MB1 BS	W	00LIC075	N/A	11/28/00	11/28/00
NITRATE BY IC	MB1	W	00LIC075	N/A	11/28/00	11/28/00
NITRATE BY IC	MB1 BS	W	00LIC075	N/A	11/28/00	11/28/00
PHOSPHATE BY IC	MB1	W	00LIC075	N/A	11/28/00	11/28/00

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD C01-008 H1138

DATE RECEIVED: 11/15/00 RFW LOT # :0011L265

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
PHOSPHATE BY IC	MB1 BS	W	00LIC075	N/A	11/28/00	11/28/00
SULFATE BY IC	MB1	W	00LIC075	N/A	11/28/00	11/28/00
SULFATE BY IC	MB1 BS	W	00LIC075	N/A	11/28/00	11/28/00

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD C01-008 H1138
RFW# : 0011L265

W.O. # : 10985-001-001-9999-00
Date Received: 11-15-00

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 1 water sample.

2. The sample was prepared and analyzed in accordance with the method checked on the attached glossary.

3. Sample holding times as required by the method and/or contract were met with the exception of Nitrate, Nitrite and Phosphate which were received past hold.

4. The cooler temperature was recorded on the chain-of-custody.

5. The method blanks were within method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits.

7. The matrix spike recoveries were within the 75-125% control limits.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor
VP, Laboratory General Manager
Lionville Laboratory

01-03-01
Date

njp\i11-265

Recra LabNet Philadelphia

WET CHEMISTRY

METHODS GLOSSARY FOR WATER SAMPLE ANALYSIS

	EPA /600	SW846	OTHER
Acidity	___ 305.1		
___Alkalinity ___Bicarbonate ___Carbonate	___ 310.1		
BOD	___ 405.1		___ 5210B (b)
Ion Chormatography:			
✓Bromide ✓Chloride ✓Fluoride	✓ 300.0	___ 9056	
✓Nitrate ✓Nitrite ✓Phosphate	✓ 300.0	___ 9056	
✓Sulfate ___Formate ___Acetate ___Oxalate	✓ 300.0	___ 9056	
Chloride	___ 325.2	___ 9251	
Chorine, Residual	___ 330.5 (mod)		
Cyanide, Amenable to Chorination	___ 335.2	___ 9010B	
Cyanide, Total	___ 335.2	___ 9010B ___ 9014	___ ILMO4.0 (e)
Cyanide, Weak Acid Dissociable		___	___ 412 (a) ___ 4500CN-I (b
COD	___ 410.4(mod)		___ 5220C (b)
Color	___ 110.2		
Corrosivity by Coupon		___ 1110(mod)	
Chromium VI		___ 7196A	___ 3500Cr-D (b)
Fluoride	___ 340.2		___ 4500-FC
Hardness, Calcium	___ 215.2		
Hardness, Total	___ 130.2		
Iodide			___ ASTM D19P202 (1)
Surfactant	___ 425.1		
___Nitrate-Nitrite ___Nitrate ___Nitrite	___ 353.2		
Ammonia	___ 350.3		
Total___ Kjeldahl ___ Organic Nitrogen	___ 351.4		
Total___ Organic ___ Inorganic Carbon	___ 415.1	___ 9060	
Oil & Grease	___ 413.1	___ 9070	
___ pH ____ pH; paper	___ 150.1	___ 9040B __ 9041A	
Petroleum Hydrocarbons, Total Recoverable	___ 418.1		
Phenol	___ 420.1 __ 420.2	__ 9065 __ 9066	
___Ortho ___Total Phosphate	___ 365.2		___ 4500-P B __ C
Salinity			___ 210A (a) __ 2520 (b)
Settleable Solids	___ 160.5		
Sulfide	___ 376.1 __ 376.2	__ 9030B/9034 (acid soluble)	
Reactive ___Cyanide ___Sulfide		___ Section 7.3 (__9014__9030B)	
Silica	___ 370.1		
Sulfite	___ 377.1		
Sulfate	___ 375.4	___ 9038	
Specific Conductance	___ 120.1	___ 9050A	
Specific Gravity			___ D5057-90 __ 213E (a)
Synthetic Precipitation Leach		__ 1312	
Total ___Dissolved __Suspended ___Solids	160 ___.1 ___.2 ___.3		
Total Organic Halides	___ 450.1	___ 9020B	
Turbidity	___ 180.1		
Volatile Solids:			
__Total __Dissolved __Suspended	___ 160.4		
Other:		Method:	

02 of 04

Recra LabNet Philadelphia
METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.
MS = Matrix Spike.
MSD = Matrix Spike Duplicate.
REP = Sample Replicate
LC = Laboratory Control Sample.
NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.

2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).

3. Test Methods for Evaluating Solid Waste (USEPA SW-846).

a. Standard Methods for the Examination of Water and Waste, 16 ed, (1983).

b. Standard Methods for the Examination of Water and Waste, 17 ed, (1989)/18ed (1992).

c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd ed, (1986).

d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965).

e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.

f. Code of Federal Regulations.

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 12/06/00

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	B10LH5	Bromide by IC	0.50 u	MG/L	0.50	2.0
		Chloride by IC	19.5	MG/L	2.5	10.0
		Fluoride by IC	1.0 u	MG/L	1.0	2.0
		Nitrite by IC	0.50 u	MG/L	0.50	2.0
		Nitrate by IC	39	MG/L	2.5	10
		Phosphate by IC	0.50 u	MG/L	0.50	2.0
		Sulfate by IC	68.5	MG/L	2.5	10.0

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 12/06/00

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	00LIC075-MB1	Bromide by IC	0.25 u	MG/L	0.25	1.0
		Chloride by IC	0.25 u	MG/L	0.25	1.0
		Fluoride by IC	0.50 u	MG/L	0.50	1.0
		Nitrite by IC	0.25 u	MG/L	0.25	1.0
		Nitrate by IC	0.25 u	MG/L	0.25	1.0
		Phosphate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	0.25 u	MG/L	0.25	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 12/06/00

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-002	B10LH5	Bromide by IC	23.7	0.00	25.0	94.9	5.0
		Chloride by IC	118	19.5	100	98.8	20.0
		Fluoride by IC	53.3	0.16	50.0	106.4	5.0
		Nitrite by IC	26	0.50u	25	105.6	5.0
		Nitrate by IC	140	39	100	101.2	20
		Phosphate by IC	24.3	0.50u	25.0	97.1	5.0
		Sulfate by IC	171	68.5	100	102.9	20.0
BLANK10	00LIC075-MB1	Bromide by IC	4.8	0.25u	5.0	96.8	1.0
		Chloride by IC	4.9	0.25u	5.0	98.0	1.0
		Fluoride by IC	10.7	0.50u	10.0	107.0	1.0
		Nitrite by IC	5.0	0.25u	5.0	99.2	1.0
		Nitrate by IC	4.9	0.25u	5.0	98.1	1.0
		Phosphate by IC	5.0	0.25u	5.0	99.5	1.0
		Sulfate by IC	4.8	0.25u	5.0	96.7	1.0

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 12/06/00

CLIENT: TNUHANFORD C01-008 H1138 RECRA LOT #: 0011L265

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-002REP	B10LH5	Bromide by IC	0.50u	0.50u	NC	2.0
		Chloride by IC	19.5	19.5	0.21	10.0
		Fluoride by IC	1.0 u	1.0 u	NC	2.0
		Nitrite by IC	0.50u	0.50u	NC	2.0
		Nitrate by IC	39	39	0.18	10
		Phosphate by IC	0.50u	0.50u	NC	2.0
		Sulfate by IC	68.5	68.6	0.23	10.0

RECRA LabNet Use Only
C011L265

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

RECRA LabNet

Client: TNU-Hanford C01-008
Est. Final Proj. Sampling Date:
Project #: 10985-001-001-9999-00
Project Contact/Phone #:
RECRA Project Manager: OJ
QC: Spec Del: Std TAT: 30 day

Date Rec'd: 11-15-00 Date Due: 12-15-00
Account #:

	A (INORG Metal)	B (INORG CN column)
Refrigerator #	5	5
#/Type Container – Liquid	1P	1P
#/Type Container – Solid		
Volume – Liquid	500	500
Volume – Solid		
Preservatives	HNO_3	–

ANALYSES REQUESTED → ORGANIC: VOA, BNA, Pest/PCB, Herb; INORG: Metal, CN

RECRA LabNet Use Only: Met(1), IC(1)

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen MS	MSD	Matrix	Date Collected	Time Collected	Met(1)	IC(1)
001	B10LH4 (F)			W	11-9-00	1241	✓	
002	↓ S			↓	↓	↓	✓	✓

Special Instructions: SOF C01-008
Run Matrix QC

DATE/REVISIONS:
Met(1) 1. Al, Ag, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, K, Mg,
↓ 2. Mn, Ni, Na, Sb, Sr, V, Zn
IC(1) 3. Br, Cl, Fl, NO_2, NO_3, PO_4, SO_4
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ✓ or Hand Delivered
Airbill # See below
2) Ambient or (Chilled)
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times Y or (N)

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec't (Y) or N
Cooler Temp 5.5 °C

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
FedEx	J. Boppel	11-15-00	1000				

Discrepancies Between Samples Labels and COC Record? Y or (N)
NOTES:

COMPOSITE ORIGINAL

PNNL

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # C01-008-98

Chem SDG H1138

Page 1 of 1

Collector: J Hogan	Contact/Requester: JH KESSNER	Telephone No.: (509) 375-4688 MSIN FAX
SAF No.: C01-008	Sampling Origin: HANFORD SITE	Purchase Order/Charge Code
Project Title: 100HR3 IAM (1&2) GW MONITORING, NOVEMBER, 2000	Logbook No.: WM-SAWS-H39	Ice Chest No.: SMC-222 Temp.
Shipped To (Lab): TMA/RECRA	Method of Shipment: GOVT. VEHICLE	Bill of Lading/Air Bill No.: 4235 7954 0463
Protocol: CERCLA	Data Turnaround: 45 Days	Offsite Property No.

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time — Total Activity Exemption: Yes ☑ No ☐
Fax TMA log-in to JH Kessner (372-9487) & DL Stewart (372-1704).

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B10LH4 (F) ✓		W	11-9-00	1241	1x500-mL G/P ✓	ICP Metals - 6010A RCRA GW ✓	HNO3 to pH <2
B10LH5 ✓		W	↓	↓	1x500-mL G/P ✓	ICP Metals - 6010A RCRA GW ✓	HNO3 to pH <2
B10LH5 ✓		W			1x500-mL P	IC Anions - 300.0 ✓	Cool 4C
B10LH5 ✓		W			1x20-mL P	Activity Scan ✓	None
B10LH5 ✓		W			2x1000-mL G/P	Gross Alpha ✓	HNO3 to pH <2
B10LH5 ✓		W			2x1000-mL G/P	Gross Beta ✓	HNO3 to pH <2
B10LH5		W			1x250-mL P	Tritium - H3 ✓	None

Relinquished By (Print / Sign)	Date/Time	Received By (Print / Sign)	Date/Time
J. Hogan / J Hogan	11-09-00 1415	FED EX	11/09/00
FED. EXPRESS	11/10/00 10 AM	E. Segura	11/10/00 10 AM
JB [illegible] / [illegible]	11-14-00 11:[illegible]	Fed Ex	11/14/00
Fed Ex	11-15-00 1000	[illegible]	11-15-00 1000

Matrix *
S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air; DS = Drum Solid; DL = Drum Liquid; T = Tissue; WI = Wipe; L = Liquid; V = Vegetation; X = Other

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

PAGE 1 Thermo NUtech CHAIN OF CUSTODY ORD # R0-11-102

11/10/00 14:53:28 WORK ID: SAF C01-008 SDG H1138

RCVD: 11/10/00 DUE: 12/25/00 KEEP: 12/25/01 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS
01A	B10LH4(F)	RECRA	DISPOS E011
02A	B10LH5	RECRA	DISPOS E011 E260
02B	B10LH5 MS	RECRA	E011 E260
02C	B10LH5 DUP	RECRA	E011 E260

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
[illegible]	11-14-0	Fed Ex	11-14-0		
✓ FedEx	11:15:00	Recra	11-15-00	[illegible]	11:15:00